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ABSTRACT

A description is provided of a project that was conducted to design, implement, and evaluate traditional and guided-practice instructional modules for independent learning of word processing skills. After an overview of the project, the report outlines the following steps in module development: identifying an instructional goal, conducting an instructional analysis, identifying entry behaviors and characteristics, writing performance objectives, developing criterion-referenced test items, developing an instructional strategy and instructional materials, designing and conducting formative evaluations, and revising instructional modules. Next, the report explains the design and findings of a summative evaluation contrasting student learning in a class of 19 students who used the traditional module and a class of 25 students who used the guided-practice module. Next, a discussion of results indicates that while both modules were effective, the guided-practice group performed better than the traditional group. Extensive appendices provide performance objectives, test items, the instructional activities for each module, evaluation results, and the traditional and guided-practice modules. (LAL)

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THE SYSTEMATIC DESIGN AND EVALUATION OF INSTRUCTION FOR THE MASTERY OF LEARNING INDEPENDENTLY

by

Ann R. O'Connor

January 1986

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Abstract

This project traces the design, implementation, and evaluation of the traditional and guided-practice modules of instruction to develop the ability to learn functions independently on a word processing system--learning independently--at a community college.

Aware that this ability is useful in an office but that use of the limited instructional time to develop this ability must be justified, the designer applied the systems approach to develop effective instruction.

Both modules utilize similar instructional strategies, but the guided-practice module includes activities that provide additional opportunities to give constructive feedback to learners.

To evaluate the modules, the designer administered the traditional module to a class group of 19 (the traditional group) and the guided-practice module to a class group of 25 (the guided-practice group).

Analysis of data collected showed, both modules were effective. The performance of the guided-practice group was markedly better than that of the traditional group. And, as a group, learners who mastered learning independently (the mastery group) performed amazingly

better than learners who did not master this ability (the non-mastery group). When the success in achieving the overall objectives of the workshop of these groups was compared, the mastery group achieved an grade of B and the non-mastery group, a grade of D.

Therefore, in the designer's opinion:

1. The markedly better performance of learners using the guided-practice module justified the use of the additional instructional time required to administer it.

2. The guided-practice module should be implemented in word processing classes in the future.

3. Since mastering learning independently appears to be related to more efficient overall performance in these classes, it may be appropriate to include strategies to develop this ability in other courses.

Preface

Background and Competency

The designer is competent to undertake this project because of her occupational background, professional affiliations, courses taken, special skills, and life experience.

Current occupation. The designer is an adjunct assistant professor at Nassau Community College.

Professional affiliations. The designer belongs to the following professional organizations: Secretarial Educators of SUNY, the Association of Information Systems Professionals, the National Society for Performance and Instruction, and the American Society for Training and Development.

Project related courses. In completing the project, the designer used skills developed through taking undergraduate and graduate courses in the theories of learning, in the theory and application of media in instructional environments, in teaching methods, in instructional systems design, in instructional systems implementation, and in training skills.

In addition, the designer used expertise developed by taking courses in the subject matter area of the modules developed.

Special skills and abilities. In addition to the background and competencies described above, the designer believes that her own proficiency in word processing has contributed positively to the completion of the project.

In the last four years, the designer has mastered at least seven word processing systems and instructed learners on at least five of them; therefore, the designer has insight into the problems learners encounter when a word processing system is learned.

Life experience. Diversified life experience added another dimension to the designer's ability to successfully complete the project.

Life experience--including experience as a classroom instructor in the subject matter area of the modules to be developed, experience as an assistant production manager and production assistant in corporate environments, experience as a director in local government, and experience as a chairperson in

educational activities in the community--has enabled the designer to develop the management skills that were necessary to successfully plan, organize, lead, and control the project.

Also, over the past four years, the designer has been engaged in designing, implementing, and evaluating instructional materials and managing learning environments as an instructor in word processing concept classes, word processing workshops, administrative office management classes, business writing, and typing classes.

To keep abreast of this ever-evolving field, the designer also studies professional publications.

Therefore, because of the designer's background and competencies described in this preface, the designer is competent to design, implement, and evaluate word processing instruction.

Accessibility Statement

The following print instructional materials for both modules are included in Appendix H in their original form in the following order:

1. Pretest: "Learning the Functions of Your System," used in both the traditional and guided-practice modules as a pretest and as an activity sheet in Unit 1.

2. Instructional Aid: "Procedure for Learning the Functions of your System," used in both the traditional and guided-practice modules.

3. Activity Sheet: "A Procedure for Decimal Tab," used in Unit Two of the guided-practice module.

4. Activity Sheet: "Using a Decimal Tab," used in Unit 3 of the guided-practice module.

5. Posttest: "Word Processing Evaluation," used in both the traditional and guided-practice modules. This document is one page of the mid-term examination.

The following non-print project materials are located at Nassau Community College, Garden City, New York 11530, in Room A120:

1. The Exxon Information Processor, which includes display screen, central processing unit, one disk drive, keyboard, and printer.

The display screen consists of a 20-line display that displays 80 characters on the screen. This screen is formatted so that prompts appear at the top of the screen and a format line shows the left and right margins and tab settings.

The Exxon printer is a 35 cps, bidirectional, daisy wheel printer that is attached to the processor by an interface. One printer services each three or four processors.

2. Level One Exxon disks that enable learners to use the following features: basic text editing, column mode, footnote capabilities, glossary function, document assembly, forms mode, letter merge, global search and replace, and records processing.

In addition, the following print material that is not included in the Appendices of the documentation of the project is also available at the same location:

1. Learner's reference manual comprised of pages extracted from the Exxon 500 Series Operator's Reference Manual with the same page numbers as those used in the Exxon 500 Series Operator's Reference Manual and a table of contents, one of which was available for each learner during the project.

2. Exxon 500 Series Operator's Reference Manual with table of contents and index, five of which were available in the classroom during the project.

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Introduction

Introduction to the Project

During this project, the instructional designer developed two modules to enable learners to learn independently, using the systems approach model developed by Walter Dick and Lou Carey (1985). After developing the modules, she conducted a summative evaluation to compare the effectiveness of the modules (Dick & Carey, 1985, p. 258).

She undertook this project when she was assigned two classes of Word Processing Workshop I and realized that this teaching assignment was an opportunity. It was the opportunity to determine whether, considering the limited instructional time available, the use of a module that includes guided-practice activities but that uses more instructional time could be justified by enabling a greater percentage of learners to learn the functions of their word processing systems independently or to achieve a higher degree of the overall objectives of Word Processing Workshop I than use of a module that omits these guided-practice activities.

In this documentation of the project, the module with guided practice will be referred to as the guided-practice module and the other module, based on strategies previously used by the designer, will be referred to as the traditional module.

The traditional module was used in one of the word processing classes; the guided-practice module was used in the other class. Initially, there were 19 learners in the class using the traditional module and 25 learners in the class using the guided-practice module. Both classes were assigned to the instruction as intact class groups.

The designer uses the components of systems approach model (Dick & Carey, 1985, pp. 5-7) as a framework for the documentation of the project.

Possible Findings

The designer anticipated two major results.

The percentage of learners who mastered the ability to learn independently using the guided-practice module would be higher than the percentage of learners who mastered this ability using the traditional module, justifying the use of the additional instructional time required to administer the guided-practice module.

The group of learners who did master the ability to learn independently would demonstrate a higher degree of mastery of the overall objectives of Word Processing Workshop I than the group of learners who did not master this ability.

In addition, the designer planned to compare the performance of learners in mastering the ability to learn independently and in achieving marketable word processing skill.

Since the guided-practice module uses much more of the limited instructional time available than the traditional module, the designer welcomes this opportunity to evaluate the effectiveness and efficiency of these instructional designs in order to improve her instructional system for Word Processing Workshop I.

Identifying an Instructional Goal

Although only one of the objectives of Word Processing Workshop I, the ability to learn independently--to read, understand, and execute instructions in reference manuals to learn the functions of a the word processing system successfully--is especially important to learners. First, they will probably operate a system other than the system on which they received their initial training in Word Processing Workshop I. Second, after a relatively short training period, they may be expected to operate the system and learn advanced functions, using only the reference manual as a training resource.

Based on the designer's observations as an instructor in word processing and keyboarding classrooms, this ability is extremely difficult for many learners to master and a need exists for more efficient instructional strategies and materials to develop this ability.

Therefore, developing the ability of learners to learn the functions of their word processing systems independently is the instructional goal of both the

guided-practice and the traditional module. In this documentation it will be called the ability to learn independently.

To demonstrate mastery of this instructional goal a learner must be able to perform as follows: Given (a) the Exxon Information Processor with disk, (b) an Exxon daisy wheel printer with interface, (c) the reference manual, (d) a description of a function the learner has not performed before to be used, (e) copy for a 25- to 50-word document that requires the use of the function to produce it, and (f) paper, the learner will be able to print out the document without help from the instructor, completing the document within one class period.

Other errors in the document, such as proofreading or formatting errors not related to the function, will not be considered when evaluating the success of the learner in achieving this objective. If the function is performed appropriately, the learner will have demonstrated mastery of the ability.

Conducting an Instructional Analysis

To determine the type of learning required of the learner to perform the goal, the designer performed an instructional analysis (Dick & Carey, 1985, p. 5).

She classified the domain of learning of the goal as an intellectual skill since to achieve the goal, the learner must perform a "unique cognitive activity," performing "an activity with previously unencountered information or examples" and manipulating symbolic information but will not need to learn a new, nontrivial, motor skill (Dick & Carey, 1985, p. 33).

This classification indicated that the designer should use procedural and hierarchical analyses to identify the subordinate skills a learner must master to perform the goal (Dick & Carey, 1985, p. 57).

Then, beginning the procedural analysis or information processing analysis, she listed the major steps a learner must take to perform the goal in the order that they must be performed. The designer's decision to proceed in this manner was based not only on the steps suggested by Dick and Carey (1985, pp. 34-36) but on the procedure recommended by Robert M. Gagne, who suggests that after determining the type of learning, an

instructional designer perform a task analysis to determine which actions must be performed in a steplike fashion (Gagne. 1985, pp. 259-262). Completion of this information processing analysis determined that to perform this goal, a learner must be able to perform three major tasks or steps: (a) to locate the instructions to perform the function in the reference manual, (b) to generate a procedure to perform the function, and (c) to produce the document.

These steps also represent the executive routine that the learner must learn to perform the goal behavior (Gagne, 1985, pp. 262-265).

Next, using the hierarchical approach, the designer analyzed each task identified during the information processing analysis to identify the prerequisites learners must learn to perform the behavior. These prerequisites are referred to by Dick and Carey (1985, p. 47) as subordinate skills and by Robert M. Gagne (1985, pp. 270-271) as enabling objectives. In constructing the hierarchy, the designer used the technique suggested by Gagne (1985, p. 272), asking herself: "What [skill] should the learner already know how to do or be able to recall when faced with the task of

learning the new rule, the absence of which would make it impossible for him to learn the new rule?" The answers to this question made it clear that this goal was not a pure intellectual goal but a complex goal, a common result of the instructional analysis process (Dick & Carey, 1985, pp. 47, 56). For example, to locate the instructions to perform the function, the learner must be able to perform an intellectual skill--locate the instructions in the reference manual. And, to be able to do this, the learner must be able to state what the function might be named if it were executed on a typewriter--verbal information. Yet to create the document, the learner must be able to perform a psyschomotor skill--keyboarding.

An outline of this hierarchical analysis appears in Appendix A: Hierarchical Instructional Analysis. The format used differs from those illustrated by Dick and Carey (1985, pp. 59-62) and Gagne (1985, p. 273-275) but shows the appropriate order, the relationship of the skills, and level of specificity.

Identifying Entry Behaviors and Characteristics

If behaviors that are assumed to be entry behaviors are not capabilities of a majority of the target population, instructional materials may be ineffective. Therefore, the designer conducted an audience analysis to identify the entry behaviors and specific characteristics that might affect the design of the instruction (Dick & Carey, 1985, pp. 79-85).

This analysis revealed that the target audience had mastered some of the subordinate skills included on the hierarchy developed during the instructional analysis.

Based on the instructor's systematic observations of the behavior of other groups of the target audience in the classroom over a number of semesters, members of the target audience who have passed the prerequisite keyboarding course, College Typewriting II, are able to keyboard at a minimum of 40 wpm. They have learned some verbal information about keyboarding, such as names and facts that relate to functions performed during keyboarding and setting up documents. And, they possess enough reading skill to comprehend instructions in keyboarding texts and reference manuals.

In addition, the designer decided to manage the sequence of instruction in Word Processing Workshop I so that these modules are not administered until learners demonstrate mastery of the entry behaviors included on the hierarchical instructional analysis by completing the introductory lesson, Lesson One, and Lesson Two.

Therefore, it is not necessary to teach these entry behaviors (Dick & Carey, 1985, pp. 80-81).

Skills identified as entry behaviors are marked with an asterisk on Appendix A, Hierarchical Instructional Analysis.

Based on a systematic study of the target audience previously conducted by the designer (see Appendix B, Analysis--Word Processing Questionnaire, Spring, 1985), and the analysis of a questionnaire administered to this group of learners on the first day of the semester (see Appendix C, Analysis--Word Processing Questionnaire, Spring, 1986), the designer identified a number of characteristics that may be pertinent to the instructional content of these modules (Dick & Carey, 1985, pp. 84-85).

Of all learners questioned, only between 13.33% (previous study) and 13.64% (this group) have had no

experience with word processors, computers, or word processing concepts.

And, learners have a positive attitude toward the value of word processing skills. Between 80% (previous study) and 93.18% (this group) feel that word processing skills will be very helpful in helping achieve their career goals, and all others feel that these skills will be moderately helpful.

Based on other information uncovered during the study conducted by the designer in 1985, the learners enrolled at Nassau Community College may vary in age from 15 to 60 years of age, but 61.88% of the student population is over 19 and 32.96% is over 25.

This study also revealed that the target audience, learners taking secretarial/office technology courses, is over 98 percent female.

These characteristics of the target audience may have the following implications for the design of the instruction.

Since at least 86% of the learners may have had experience with word processors, computers, or word processing concepts, the instructor should be asked to

draw on the learners' experiences to develop meaningful analogies that facilitate learning.

Since 61.88% of the student population is over 19 and 32/96% is over 25, strategies should be appropriate for adults.

Since over 98% of the secretarial/office technology population is female, experiences to motivate these learners by developing their awareness of the career opportunities word processing skills open up to women should be incorporated into the instruction.

Finally, since all learners have a positive attitude toward the value of word processing skills, this attitude should be reinforced by the instruction so that learners are motivated to master learning independently.

Writing Performance Objectives

Having completed the audience analysis, the designer wrote a performance objective for each skill identified during the instructional analysis to serve as a guideline in selecting content and developing instructional strategies to achieve mastery of the terminal objective (Dick & Carey, p. 98). Every objective includes the conditions, the specific performance, and the criteria for evaluating the performance (Dick & Carey, pp. 5, 99-100).

The terminal objective and subordinate skill statements identified with their matching performance objectives are outlined in Appendix D, Performance Objectives.

Developing Criterion-Referenced Test Items

At this point, the designer developed criterion-referenced test items to directly measure the behaviors described in the performance objectives written for each skill identified during the learning analysis that must be taught.

Although Dick and Carey recommend that test items be developed for those skills identified as entry behaviors as well as those to be taught so that it can be determined if entry behaviors are critical to achieving mastery of the goal or if learners do have actually have these skills (Dick & Carey, p. 109), the designer did not develop test items for entry behaviors. She did not because the introductory lesson and Lessons One and Two, which were already designed and which learners will successfully complete before the modules being designed are administered actually constitute entry-behavior tests that measure the skills learners must have to begin the instruction; therefore, test items have already been developed for these skills in those lessons.

These criterion-related test items along with the subskills they relate to and their subordinate objectives are outlined in Appendix E, Criterion-Related Text Items.

Having developed the criterion-related test items, the designer began to identify the strategies and media to be used to master the terminal objective.

Developing an Instructional Strategy

To complete the next component in the systems approach model, the designer developed two eclectic strategies to use in the instruction and in selecting appropriate media for the guided-practice and traditional modules.

These strategies are based on (a) the theory of instruction described by Gagne (1985, pp. 243-258); (b) an exploration of four theories of learning, features of andragogic learning designs, and methods appropriate for adult learners presented by Dugan Laird (1985, pp. 113-168); (c) the experiential learning model recommended by Donald F. Michalak and Edwin G. Yager (1979, pp. 75-81); (d) and the information accumulated during the completion of the previous steps in the system approach model.

Since the terminal objective of these modules is an intellectual skill, the external events of the instruction will include the nine instructional events described by Gagne as appropriate support for the learning processes to develop intellectual skill (1985, pp. 243-258). Examples of each of these nine events of instruction described by Gagne are pointed out in the instructional strategies developed for these modules.

The audience analysis reveals that a very large majority of learners are adults over 19 and the remaining learners fall between 15 and 19; therefore, how adults learn was considered not only in developing the instructional strategies but in developing the instruction materials. The designer weighed the instructional events to see if they seemed appropriate in light of Laird's exploration of four theories of learning--sensory stimulation, reinforcement, facilitation, and andragory--and in light of his summary of how theories relate to adult learning (Laird, 1985, pp. 113-128). These events were also weighted in light of the experiential learning model recommended for use in andragogic instruction by Michalak and Yager (1979, pp. 75-81). Examples of both influences are also pointed out in the instructional strategies.

Finally, the designer considered a domain of learning not mentioned at all by Dick and Carey (1985) but discussed by Gagne (1985, pp. 139-152) as being a capability that learners acquire as they learn and store intellectual skills and other capabilities: cognitive strategies.

Gagne (1985, p. 143) states that when students solve problems, they presumably learn not only rules to solve the problems but also general ways to accomplish problem solving--learning how to think. Although during this discussion, Gagne (1985, pp. 246-257) points out that the evidence that cognitive strategies can be taught is meager, the designer also considered what Gagne's theory of instruction had to say about cognitive strategies when designing this instruction (1985, pp. 246-257) since the effective cognitive strategies can bring about striking changes in intellectual performances (Gagne, 1985, p. 150).

Therefore, the external events of the instruction include the instructional events described by Gagne as appropriate support for the learning process to develop cognitive strategies whenever it seems appropriate to blend them with the events designed to develop the intellectual skills (1985, pp. 243-258). Examples of how some of these events of instruction to support the process of learning cognitive skills are incorporated into the instructional design can be found in the instructional strategies developed for these modules.

Having considered accepted theories of instruction, the characteristics of the target audience, and the time available for instruction, the designer completed the instructional strategies. They include the following components, as recommended by Dick and Carey (1985, pp. 139-140): preinstructional activities, information presentation, student participation, testing, and follow-through activities. The strategies can be found in Appendix F, Instructional Strategies for the Traditional and Guided-Practice Modules.

Developing Instructional Materials

Having completed the instructional strategies for the guided-practice and traditional modules, the designer determined the media to be used and the instructor's role in the instruction. Then, the actual instructional materials were developed.

In selecting the media for this module, a number of factors were considered: the objectives to be accomplished, how the content was to be transmitted, the characteristics of the module, and the properties of the media available.

Using the charts and checklists given by Ronald H. Anderson (1983), it was determined that it would be appropriate to use an instructional aid to support an instructor-led presentation in this instruction.

To determine appropriate media classification to use for the instructional aid, the designer identified the following characteristics of the lessons: these modules are designed to instruct, the content to be taught is intellectual skills, it is practical to demonstrate using the actual objects, and it is desirable to display enlargements.

Working through the media selection process outlined by Anderson (1985, pp.20-29) showed that an instructor-led presentation supported by physical objects with printed materials were appropriate media for use in instruction with these characteristics.

The fact that the designer does have the physical objects, supplies, and facilities available to produce and use instruction with these media confirmed the appropriateness of the media selected.

Therefore, the media will be an instructor-led presentation supported by the Exxon Information Processor, an Exxon daisy wheel printer with interface, the reference manual, hand-outs, and chalk board displays (Anderson, p. 29).

The instructor will take an active role in delivering the information, using the instructional strategies developed as a guideline for her presentations and chalk board displays.

An instructional aid, a printed hand-out, will be developed for learners to use independently when completing assignments.

Using the instructional strategies already developed, rough drafts of the pretest, the instructional aid, the

activity hand-outs, and the posttest were produced for use in evaluating the instruction.

Designing and Conducting the Formative Evaluation

Formative evaluations were conducted to see if the instruction is effective and how to improve it (Dick & Carey, p. 205).

Designing the Formative Evaluation

Because it was extremely difficult to locate members of the target audience with appropriate entry behaviors and not possible to assemble a group to take through the pretest, units of instruction, and posttest, the designer had to rely on one-to-one evaluation to identify and remove the mistakes in the instruction.

The designer worked with members of the target audience who were enrolled in other sessions of Word Processing Workshop I during laboratory periods, periods in which the classroom is open to learners to enable them to work independently on their projects.

Conduction the Formative Evaluation

The designer explained that the materials were being developed and that the learner's help was needed to improve them before they were used in a class, observed the learner's word processing skill, questioned the learner to determine if she knew how to use the functions

to be learned in the instructional activity, and then administered the pretest if it appeared the learner had appropriate entry behaviors and had not yet learned the functions. None of the three learners worked with demonstrated mastery of the terminal objective on the pretest.

Directly after the pretest, the designer administered the instruction, actually presenting the unit or units to each learner as if she were a class, using a sheet of paper instead of the chalk board and interacting with the learner as the instruction progressed to discover any typographic errors in the materials, omissions of content, and any difficulties the learner had with the concepts being taught and the learning sequence as recommended by Dick and Carey (1985, pp. 199-200).

In total, five learners participated in the formative testing. Two learners completed the instruction for the traditional module and one learner completed the instruction for the guided-practice module.
Two other learners read through the instructional material for the guided-practice module after the material had been revised, based on the data collected during the the testing of the first three learners.

To work through the instruction in the time available, one lab period, the designer decided that certain selected subordinate objectives could be modified without invalidating the test results. For example, the learners did not print out the documents created unless there was time. In an one-on-one testing situation, the designer can evaluate the learner's success in using the function by observing the learner create the document on the screen and prepare to print the document. Also, the entire Lesson 6-3 document did not have to be created. Once the learner had set up the tabulation using the decimal tab, the designer could move on to the next instructional activity, the posttest.

The designer was able to collect objective-by-objective data on the performance of the three learners who completed the instruction as she observed their performances.

Of course, since the posttest was given directly after the completion of the instructional material in both modules, these learners did not have the opportunity to practice these skills by using the instructional aid while working on their other projects as learners would do in the actual classroom implementation. Furthermore, the

designer could not be certain that the learning would be retained over a period of time.

After administering the instruction, the designer asked the learners a number of questions:

1. Was the instruction interesting; all responded positively.

2. Did you know what you were trying to learn; all responded positively.

3. Did you get enough feedback; learners working with the traditional module responded one positively and one negatively.

4. How could the instruction be improved; one learner said that she did not understand the fourth step in the procedure on the learning aid.

Revising Instructional Materials

Based on the data collected during the formative evaluation, the designer examined the validity of the instructional analysis, the assumptions about entry behaviors and characteristics of the target audience, the statements of performance objectives, and test items as recommended by Dick and Carey (1985, p. 6).

Continuing the process recommended, the designer summarized the pretest results, embedded-item observations made during the instructional activities, and posttest results (Dick & Carey, p. 224). A summary of the data collected during testing can be found in Appendix G, Summary of Results of Formative Testing.

Then, using this data together with the designer's insights and learners' responses, the designer examined the instructional strategies for the objectives, especially for the objective with which learners experienced difficulty, also as recommended by Dick and Carey (1985, pp. 224-225).

The examination revealed that all three learners' performances improved dramatically, although one learner working with the tradition module was not able master the final subordinate skill in the instruction and, therefore,

did not achieve the terminal objective. The same learner was not able to respond appropriately to embedded items 2.3B and 2.3C; however, this learner did master these objectives during the posttest. This indicated that the materials appear to be effective except for the strategy for Subordinate Objective 4. The designer noted that the section of the instructional aid another learner did not understand was related to Subordinate Objective 4.

Several changes were made in the content of the instructional aid--basically changes in the wording and the words underlined to delineate significant features on the instructional aid and in the information presented for Subordinate Objective 4. The designer also made minor changes to improve the diagram displayed as feedback to embedded items 2.3B and 2.3C.

Copies of the instructional materials developed during the project can be found in Appendix H, Instructional Materials: Traditional and Guided-Practice Modules.

After revising the instructional materials, the designer administered the traditional module in one class and the guided-practice module in the other class of Word Processing Workshop I.

Summative Evaluation

Conducting Summative Evaluation

Dick and Carey define summative evaluation "as the design, collection, and interpretation of data and information for a given set of instruction for the purpose of determining the value or worth of that instruction" (1985, p. 258). Therefore, the designer undertook the summative evaluation of both modules to compare the effectiveness of each and to determine if the instruction produced the anticipated results.

Administration of the Modules

The designer administered one module in each of the word processing classes during the spring semester, 1986. Learners completed the pretest in mid February. The instruction took place in the beginning of March, followed by the posttest in the third week of March.

During the implementation, the designer's role was that of instructor. Following the instructional strategies developed, she delivered the instructor-led presentations supported by the Exxon system, the reference manual, hand-outs, and chalk board displays.

Design of the Study

During the summative testing and at end of the semester, the designer carefully collected data related to three variables and the criteria previously established for them.

These variables, the criteria established for them, and the group perspectives used to analyze these data follow.

Mastery of the ability to learn independently (learning independently) is demonstrated if the learner achieves the terminal objective on the posttest. The degree of overall mastery of the objectives of Word Processing Workshop I (degree of mastery) is determined by averaging the learner's grades on the final exam, on the production assignments, and on the percentage of production assignments completed. Marketable word processing skill (marketable skill) is demonstrated if the learner's grade on the final examination is at least 60% and if the learner has completed satisfactorily at least 60% of the production assignments. This requires execution of all the functions a learner must master in this course.

The group perspectives are (a) learners using the traditional module (traditional group), (b) learners using the guided-practice module (guided-practice group), (c) learners from the traditional and guided-practice groups who did master learning independently (mastery group), and (d) learners from the traditional and guided-practice groups who did not master learning independently (non-mastery group).

There were 19 traditional-group learners and 25 guided-practice learners in the study initially.

After administering the posttest, the designer analyzed data for 19 traditional-group learners and for 23 guided-practice learners remaining in the study to determine the effectiveness of the modules.

At the end of the semester, 17 learners in the traditional group and 22 learners in the guided-practice group had complete data. The designer analyzed these data to determine the percentage of learners who mastered learning independently in the traditional and guided-practice groups. She compared the degree of mastery calculated (a) for the traditional and guided-practice groups and (b) for the mastery and non-mastery groups.

And, she compared the percentage of learners achieving marketable skill in these groups.

On the last day of class, learners completed an attitude questionnaire, which is designed to measure their reactions to the course, that includes one item on learning independently. The item asks if they can read, understand, and execute instructions in reference manuals better now than at the beginning of the semester or if they feel they have not improved their ability to do this during the semester.

Discussion of Results

Designer's Expectations

Prior to the project, the designer anticipated two major results. She anticipated (a) that the percentage of guided-practice learners mastering the ability to learn independently would be higher than the percentage of traditional learners mastering this ability and (b) that the degree of mastery demonstrated by the mastery group would be higher than the degree of mastery demonstrated by the non-mastery group.

Presentation of Data

The percentage of guided-practice learners mastering learning independently is higher than the percentage of traditional learners mastering this ability (see Table 1).

The degree of mastery calculated for the mastery group is higher than the degree of mastery calculated for the non-mastery group (see Table 2).

The percentage of mastery-group learners achieving marketable skill is higher than the percentage of non-mastery-group learners achieving marketable skill (see Table 2).

Table 1

Comparison of the Effectiveness of the Traditional Module and the Guided-Practice Module in Enabling Learners to Master Learning Independently

Mastery of Learning Independently	Groups	
	Traditional	Guided-Practice
Pretest	15.79%	15.79%[a]
Posttest	63.16%	86.96%[b]

Note. The posttest information presented is based on data collected for 19 learners in the traditional group and 23 learners in the guided-practice group who completed the instruction and posttest. If posttest information is calculated based on the data collected for learners who completed the instruction, the posttest, and the course--17 learners in the traditional group and 22 learners in the guided-practice group--the posttest percentages would be as follows: 64.17% for the traditional group and 86.36% for the guided-practice group.

[a] This percentage represents the success of 3 learners out of the 19 learners who completed the pretest, the instruction, and the posttest.

[b] This percentage represents the success of 20 out of 23 learners, including four learners who completed the instruction and the posttest but were absent for the pretest. If posttest success is calculated for only the 19 learners who completed the pretest, the instruction, and the posttest, the percentage of learners who master learning independently is 89.47%.

Table 2

Comparison of the Percentage of Marketable Skill and the Degree of Mastery Achieved by the Mastery and Non-Mastery Groups

Variable	Learning Independently: Mastery	Learning Independently: Non-Mastery
Marketable Skill	90.00%	77.78%
Degree of Mastery: Mean[a]	3.03	1.77
Mode	4.00	3.00 2.17 1.33
Median	3.25	1.33

Note. The mastery group consists of learners from the traditional and guided-practice groups who did master the ability to learn independently. The non-mastery group consists of learners from these groups who did not master the ability to learn independently.

[a] Grade equivalent: 4, A; 3.5, B+; 3, B; 2.5, C+; 2, C; 1.5, D+; 1, D; 0, F.

The degree of mastery calculated for the guided-practice group is higher than the degree of mastery calculated for the traditional group (see Table 3).

Learners who completed the course evaluation feel that they can read, understand, and execute instructions in reference manuals better at the end of the semester than they could at the beginning of the semester: 92.3% in the tradition group and 94.7% in the guided-practice group.

Table 3

Comparison of the Percentage of Marketable Skill and the Degree of Mastery Achieved by the Traditional and Guided-Practice Groups

Variable	Groups: Traditional	Groups: Guided-Practice
Marketable Skill	76.47%	95.45%
Degree of Mastery: Mean[a]	2.18	3.17
Mode	2.17	4.00 3.75 3.00
Median	2.17	3.25

Note. In total, five learners were dropped from the study. Four of the learners dropped did not complete the course, but none earned less than a C average on the assignments and tests completed before they stopped attending classes. The other learner, who was dropped from the study because she did not take the posttest, did complete the course, achieving marketable skill and a degree of master of 2.83.

[a] Grade equivalent: 4, A; 3.5, B+; 3, B; 2.5, C+; 2, C; 1.5, D+; 1, D; 0, F.

Analysis of Data

The analysis performed on the data collected during the pretests and posttests showed that using both modules enable many learners to master the terminal objective, improving their performance. Therefore, both modules of instruction were effective.

Furthermore, based on their responses on the attitude questionnaire, over 90% of learners in both groups feel that they have improved their ability to read, understand, and execute instructions in reference manuals during the semester.

However, since 86.96% of guided-practice learners and only 63.17% of traditional-learners mastered the terminal objective, the guided-practice module was more effective than the traditional module for these learners, confirming the designer's first expectation.

The degree of mastery calculated for the mastery group, 3.03, is higher than the degree of mastery calculated for the non-mastery group, 1.77, confirming the designer's second expectation, as well.

The most interesting information surfaces, however, when the designer compares the data on the three variables.

The performance of the guided-practice group was markedly better than the performance of the traditional group.

First, 95.45% of guided-practice group achieved marketable skill, but only 76.47% of traditional group achieved it.

Second, the degree of mastery for the the guided-practice group is 3.17, and the degree of mastery for the traditional group is considerably lower, 2.18.

The other two measures of central tendency, mode and median, were calculated for both groups to provide more information about the performance of learners in achieving degree of mastery. The mean, mode, and median for the traditional group are within a hundredth of being equal, indicating a fairly normal distribution (David H. Weaver, 1981, pp. 49-52). In the guided-practice group, the median is slightly higher than the mean, indicating that the distribution is negatively skewed, containing a few very low scores (Weaver, 1981, pp. (49-52).

However, whichever measure of central tendency is used to compare the groups' performances, mean or median, the guided-practice group clearly achieved a degree of mastery equivalent to approximately one full grade higher than the

degree of mastery achieved by the traditional group, i.e., B compared to C.

When the data collected for the mastery and non-mastery groups were analyzed, the performance of the mastery group was very much better than that of the non-mastery group.

The percentage of mastery-group learners achieving marketable skill is considerably higher than the percentage of non-mastery-group learners achieving it, i.e., 90% in the mastery group compared to 77.78% in the non-mastery group.

The degree of mastery of the mastery group, 3.03, is higher than the degree of mastery of the non-mastery group, 1.77.

Here, too, the mode and median were calculated to provide additional information about the performances of both groups in achieving degree of mastery. The mean of the mastery group is smaller than the median, indicating that the distribution of scores is negatively skewed with a few very low scores (Weaver, 1978). In the non-mastery group, the mean is larger than the median, indicating that the distributions of scores is positively skewed with a few very high scores (Weaver, 1978). Since this

information indicates that both distributions are skewed, the median is quite useful as a measure of comparison (Weaver, 1978). If the mean is compared, the mastery group achieved a degree of mastery equivalent to one and one-half grades higher than the degree of mastery achieved by the non-mastery group--i.e., B compared to D+. But, if we compare the medians, the mastery group achieved a degree of mastery equivalent to approximately two grades higher than the degree of mastery achieved by the non-mastery group--i.e., B compared to D.

Implications

These results seem to have implications for Word Processing Workshop I. In the designer's opinion, the extra instructional time used to complete the three guided-practice activities was clearly a worthwhile use of class periods for these members of the target audience. The performance of the guided-practice group, evaluated by the three variables, is markedly better than that of the traditional group. Therefore, on the basis of this evaluation, the designer, as instructor, would select the guided-practice module as the instruction of choice in the future.

However, the comparison of the performances of the mastery and non-mastery groups seems to have the greatest implication for the designer's instructional system in Word Processing Workshop I and, perhaps, in other courses.

In this case, the performance of the mastery group, evaluated by these three variables, is amazingly better than that of the non-mastery group. Therefore, although the designer is aware that other variables within the instructional environment may have influenced these results, in the designer's opinion, mastering learning independently certainly appears to be related to more efficient overall performance in the course--to achieving a greater degree of success.

Therefore, not only will the designer use the guided-practice module next time she teaches word processing but hopes to share this information and instructional design with other word processing instructors in an effort to influence larger numbers of the word processing learners.

In addition, the designer will review her other courses, looking for ways to include strategies that develop the learner's ability to locate other types of

information and generate procedures to solve other types of problems.

The end products of this project are information and an effective instructional design. Through this documentation and, perhaps, a journal article, the designer hopes to share these end products with other instructional designers, adding to the body of knowledge available to them.

Appendices

Appendix A: Hierarchical Instructional Analysis

1. TERMINAL OBJECTIVE: (IS) Given the Exxon Information Processor with disk, an Exxon daisy wheel printer with interface, the reference manual, a description of a function the learner has not performed before to be used, copy for a 25- to 50-word document that requires the use of the function to produce it, and paper, the learner will be able to create the document, using the function and printing out the document without help from the instructor and completing the assignment within one class period.

   Other errors in the document, such as proofreading or formatting errors not related to the function, will not be considered when evaluating the success of the learner in achieving this objective. If the new function is performed appropriately, the learner will have demonstrated the ability to learn functions independently.

   The document must be completed within one class period.

An asterisk marks each subordinate skill or knowledge that is an entry behavior and does not need to be taught.

2. (IS) Locate instructions to perform the function in the reference manual.

   2.3 (IS) Discriminate between similarities or dissimilarities on illustration/illustrations and verbal descriptions on page or pages of the reference manual and the copy for the document to be created.

   *2.3.1. (IS) Read.

2.2 (IS) Locate the appropriate page or page numbers in index or table of contents.

*2.2.1 (IS) Read.

2.1.A (VI) State name used to describe the function in the written directions.

2.1.A.1 (IS) Read.

2.1.B (VI) State name used to describe the function during oral instructions.

2.1.C (VI) State what this function might be named if it were executed on a typewriter.

3. (IS) Generates a procedure to perform the function.

*3.1 (IS) Read.

4. (IS) Produce the document, using the function at the appropriate point in the creation of the document.

*4.2 (IS) Print a document.

*4.2.3 (IS) Identify appropriate commands to print a document.

*4.2.3.1 (PM) Press keys.

*4.2.2 (IS) Position knob on interface on appropriate mark.

*4.2.1 (PM) Insert paper in the printer.

*4.1 (IS) Create a document.

*4.1.2 (PM) Keyboard text.

*4.1.1 (IS) Format a document.

*4.1.1.1 (PM) Press keys.

Appendix B: Analysis-Word Processing Questionnaire, Spring 1985

	Total 1st Response	Total 2nd Response	Total 3rd Response
DESCRIPTORS			
	1-None 2-Some 3-Quite a Bit		
WP EXPERIENCE	9	4	1
Percentage	60.00%	26.67%	6.67%
	Not 100% due to unclear response.		
	1-None 2-Some 3-Quite a Bit		
COMPUTER EXPERIENCE	5	9	1
Percentage	33.33%	60.00%	6.67%
	1-Very Help 2-Mod Help 3-Not Help		
HELP CAREER GOALS	12	3	-
Percentage	80.00%	20.00%	-
	1-Yes 2-No		
WP CONCEPTS	7	8	-
Percentage	46.67%	53.33%	
	1-Very Worth 2-Mod Worth 3-Not Worth		
ATTITUDE-PRODUCTION	5	8	1
Percentage	35.71%	57.14%	7.14%
	Only 14 learners responded.		
SUMMARIZED DATA			
WP and/or Computer	13	-	-
No WP/Concepts/Computer	2	-	-
Percentage	13.33%	-	-

Appendix C: Analysis--Word Processing Questionnaire, Spring, 1986

	Total 1st Response	Total 2nd Response	Total 3rd Response
DESCRIPTORS			
	1-None 2-Some 3-Quite a Bit		
WP EXPERIENCE	18	23	3
Percentage	40.91%	52.27%	6.82%
	1-None 2-Some 3-Quite a Bit		
COMPUTER EXPERIENCE	16	26	2
Percentage	36.36%	59.09%	4.55%
	1-Very Help 2-Mod Help 3-Not Help		
HELP CAREER GOALS	41	3	-
Percentage	93.18%	6.82%	-
	1-Yes 2-No		
WP CONCEPTS	14	29	-
Percentage	31.82%	65.91%	-
	One learner did not respond.		
	1-Very Worth 2-Mod Worth 3-Not Worth		
ATTITUDE-PRODUCTION	32	9	-
Percentage	78.05%	21.95%	-
	Three learners did not respond.		
	SUMMARIZED DATA		
No WP/Concepts/Computer	6	-	-
Percentage	13.64%	-	-

Appendix D: Performance Objectives

1. TERMINAL OBJECTIVE: (IS) Given the Exxon Information Processor with disk, an Exxon daisy wheel printer with interface, the reference manual, a description of a function learner has not performed before to be used, copy for a 25- to 50-word document that requires the use of the function to produce it, and paper, the learner will be able to create the document, using the function and printing out the document without help from the instructor.

   Other errors in the document, such as proofreading or formatting errors not related to the function, will not be considered when evaluating the success of the learner in achieving this objective. If the new function is performed appropriately, the learner will have demonstrated the ability to learn functions independently.

   The document must be completed within one class period.

2. (IS) Locate instructions to perform the function in

   the reference manual.

   SUBORDINATE OBJECTIVE: Given the reference manual, a description of a function the learner has not performed before to use, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to list the steps given in the reference manual to perform this function.

<DECISION POINT> Go the page or pages located in reference manual contain the appropriate instructions to perform the function? If yes, go to 3, generate a procedure to perform function; and if no, go to 2:1A, state name used to describe the function in the written directions; 2:1B, state name used to describe the function during the oral

instructions; or 2:1C, state what this function might be named if it were executed on a typewriter.

2.3 (IS) Discriminate between similarities or dissimilarities in illustration/illustrations and verbal descriptions on page or pages of the reference manual and the copy for document to be created.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of a function the learner has not performed before to be used, and copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to write down on the sheet provided the exact name used in the reference manual for the function.

*2.3.1 (IS) Read.

SUBORDINATE OBJECTIVE: Given the Exxon Information Processor with disk, an Exxon daisy wheel printer with interface, the reference manual, the instructor prepared instructional materials and job aids listed in the unit plan for Lesson One: Create and Print Out Simple Documents, and Information Processing: Keyboarding Applications and Exercises, and paper, the learner will be able to identify the documents to be created, create the documents, and print out the documents assigned.

2.2 (IS) Locate the appropriate page or page numbers in index or table of contents.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of a function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to

produce it, the learner will be able to write down on the sheet provided the the page number or numbers that relate to the function.

*2.2.1 (IS) Read.

SUBORDINATE OBJECTIVE: Given the Exxon Information Processor with disk, an Exxon daisy wheel printer with interface, the reference manual, the instructor prepared instructional materials and job aids listed in the unit plan for Lesson One: Create and Print Out Simple Documents, and Information Processing: Keyboarding Applications and Exercises, and paper, the learner will be able identify the documents to be created, create the documents, and print out the documents assigned.

2.1.A (VI) State name used to describe the function in the written directions.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet with with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to state the name function on the sheet provided.

*2.1.A.1 (IS) Read.

SUBORDINATE OBJECTIVE: Given the Exxon Information Processor with disk, an Exxon daisy wheel printer with interface, the reference manual, the instructor prepared instructional materials and job aids listed in the unit plan for Lesson One: Create and Print Out Simple Documents, and Information Processing: Keyboarding Applications and

Exercises, and paper, the learner will be able identify the documents to be created, create the documents, and print out the documents assigned.

2.1.B (VI) State name used to describe the function during oral instructions.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet with with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to state the name of the function on the sheet provided.

2.1.C (VI) State what this function might be named if it were executed on a typewriter.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet with with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to state the name of the function on the sheet provided.

3. (IS) Generates a procedure to perform the function.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to write down a procedure that will create the document, using the function, if executed on the Exxon Information Processor on the sheet provided.

*3.1 (IS) Read.

SUBORDINATE OBJECTIVE: Given the Exxon Information Processor, an Exxon daisy wheel printer with interface, the reference manual, the instructor prepared instructional materials and job aids listed in the unit plan for Lesson One: Create and Print Out Simple Documents, Information Processing: Keyboarding Applications and Exercises, and paper, the learner will be able identify the documents to be created, create the documents, and print out the documents assigned.

4. (IS) Produce a document, using the function at the appropriate point in the creation of the document.

SUBORDINATE OBJECTIVE: (IS) Given the Exxon Information Processor with disk, an Exxon daisy wheel printer with interface, the reference manual, the name of a function that the learner has not performed before to use, a procedure for the function that will create the document if it is executed on the Exxon Information Processor, copy for a 25- to 50-word document that requires the use of the function to produce it, and paper, the learner will be able to make some attempt, even if not completely appropriate, at the appropriate point in the document to execute the procedure.

*4.2 (IS) Print a document.

SUBORDINATE OBJECTIVE: (IS) Given the Exxon Information Processor with disk, an Exxon daisy wheel printer with interface, the reference manual, the instructor prepared instructional materials and job aids listed in the unit plan for Lesson Two: Automatic Error Correction and Changing Margins, Information Processing: Keyboarding Applications and Exercises, and paper, the learner will be able to print out the documents created on the screen with appropriate margins.

*4.2.3 (IS) Identify appropriate commands to print

a document.

SUBORDINATE OBJECTIVE: (IS) Given the Exxon Information Processor with disk, an Exxon daisy wheel printer, the reference manual, the instructor prepared instructional materials and job aids listed in the unit plan for Lesson One: Create and Print Out Simple Documents, Information Processing: Keyboarding Applications and Exercises, and paper, the learner will be able to print out documents assigned in Lesson One.

*4.2.3.1 (PM) Press keys.

SUBORDINATE OBJECTIVE: (PM) Given the Exxon Information Processor with disk with a blank screen, the job aid for the first document, and copy for a first document that conforms to the default format of the Exxon Information Processor, the learner will be able to keyboard the text on the screen.

*4.2.2 (IS) Position knob on interface on appropriate mark.

SUBORDINATE OBJECTIVE: (IS) Given the Exxon Information Processor with disk, an Exxon daisy wheel printer with interface, the reference manual, the instructor prepared instructional materials and job aids listed in the unit plan for Lesson One: Create and Print Out Simple Documents, Information Processing: Keyboarding Applications and Exercises, and paper, the learner will be able to print out the documents created in Lesson One without printing "garbage" when executing the printed procedure.

*4.2.1 (PM) Insert paper in the printer.

SUBORDINATE OBJECTIVE: (PM) Given the Exxon Information Processor with disk, a Exxon daisy wheel printer with interface, the reference manual, the instructor prepared instructional materials and job aids listed in the unit plan for Lesson One: Create and Print Out Simple Documents, Information Processing: Keyboarding Applications and Exercises, and paper, the learner will be able to insert a sheet of paper into printer, aligning the left edge of the paper with the farthest line to the left on the margin scale when printing out the documents in Lesson One.

*4.1 (IS) Create a document.

SUBORDINATE OBJECTIVE: (IS) Given the Exxon Information Processor with disk, an Exxon daisy wheel printer, the reference manual, the instructor prepared instructional materials and job aids listed in the unit plan for Lesson One: Create and Print Out Simple Documents, Information Processing: Keyboarding Applications and Exercises, and paper, the learner will be able to access a blank screen on the Exxon Information Processor.

*4.1.2 (PM) Keyboard text.

SUBORDINATE OBJECTIVE: (PM) Given the Exxon Information Processor with disk with a blank screen, the job aid for Introductory Lesson: Creating Your First Document, and copy for a first document that conforms to the default format of the Exxon Information Processor, the learner will be able to keyboard the text on the screen.

*4.1.1 (IS) Format a document.

SUBORDINATE OBJECTIVE: (IS) Given the Exxon Information Processor with disk, an Exxon daisy wheel printer with interface, the reference manual, the instructor prepared instructional materials and job aids listed in the unit plan for Lesson Two: Automatic Error Correction and Changing Margins, Information Processing Keyboarding Applications and Exercises, and paper, the learner will be able to create and print out the documents assigned in Lesson Two with appropriate formats.

*4.1.1.1 (PM) Press keys.

SUBORDINATE OBJECTIVE: (PM) Given the Exxon Information Processor with disk with a blank screen, the job aid for Introductory Lesson: Creating Your First Document, and copy for a first document that conforms to the default format of the Exxon Information Processor, the learner will be able to keyboard the text on the screen.

*A subordinate skill or knowledge that is an entry behavior and does not need to be taught.

Appendix E: Criterion-Related Test Items

SUBSKILL 2: (IS) Locate instructions to perform the function in the reference manual.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of a function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will list the steps given in the reference manual to perform this function.

TEST ITEMS: List the steps given in the manual for for the function (center indent, decimal tab, superscript).

SUBSKILL 2.3: (IS) Discriminate between similarities or dissimilarities on illustration/ illustrations and verbal descriptions on page or pages of the reference manual and the copy for document to be created.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of a function not performed before to be used, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to write down the exact name used in the reference manual for the function on the sheet provided.

TEST ITEMS: Write down the exact name used in the reference manual for the function you must use to create the document using the function illustrated.

SUBSKILL 2:2 (IS) Locate the appropriate page number or numbers in the index or table of contents.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of a function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to write down on the sheet provided the page number or numbers that relate to the function.

TEST ITEM: Write down the page or pages in your reference manual on which the instructions for indenting text using the automatic formatting function of your system are located.

SUBSKILL: 2.1.A: (VI) State name used to describe the function in the written directions.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to state the name on the sheet provided.

TEST ITEM: Circle the name used for the function in the written instructions.

SUBSKILL 2.1.B: (VI) State name used to describe the function during oral instructions.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to state the possible name of the function on the sheet provided.

TEST ITEM: Write down what this function was called in the oral instructions.

SUBSKILL 2.1.C: (VI) State what this function might be named if it were executed on a typewriter.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to state the name of the function on the sheet provided.

TEST ITEM: Write down what this function would be called if it were executed on a typewriter?

SUBSKILL 3. (IS) Generates a procedure to perform the function, while creating the document.

SUBORDINATE OBJECTIVE: Given the reference manual, a deacription of the function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, and the function the learner has identified, the learner will be able to write down a procedure that will create the document, using the function, if executed on the Exxon Information Processor on the sheet provided.

TEST ITEM: Write down what do you have to do to indent text, using the automatic formatting function of your system.

TEST ITEM: In your own words, write down the steps you must execute to use decimal tab, using as few words as possible.

SUBSKILL 4. (IS) Produce document, using the function at the appropriate point in the creation of the document.

SUBORDINATE OBJECTIVE: (IS) Given the Exxon Information Processor with disk, an Exxon daisy wheel printer with interface, the reference manual, the name of a function that the learner has not performed before to use, a procedure for the function that will create the document if it is executed on the Exxon Information Processor, copy for a 25- to 50-word document that requires the use of the function to produce it, and paper, the learner will be able to create the document using the function and print out the document without help from the instructor within one class period.

TEST ITEM: Using the automatic formatting function of your system to indent the text, create and print out the document shown in Section 2.

TEST ITEM: Create and print out Lesson 6-3, using a decimal tab to align the decimal points.

TEST ITEM: Create the following document, using single spacing. Print out a copy of the document.

Appendix F: Instructional Strategy for the Traditional and Guided-Practice Modules

As the first step in developing the instructional strategies, the designer estimated the time required and/or available for learners to use the materials and determined the sequencing and clustering of the objectives in the instruction. The sequencing of the objectives is similar for both modules. However, in the traditional module, all objectives are clustered in "Unit One: Learning Functions Independently," which will be completed within one class period. In the guided-practice module, the objectives are clustered in three units: Unit One, "Learning the Functions of Your System"; Unit Two, "A Procedure for Decimal Tab"; and Unit Three, "Using Decimal Tab" and will be completed within three class periods. A summary of the sequencing and clustering of the objectives is presented in Table 4.

Table 4

Sequences and Clustered Objectives for the Traditional and Guided-Practice Modules

Traditional Module[a]

Subskill Number

Pretest
Unit 1: Learning the Functions of Your System

2.1.A
2.1.B
2.1.C
2.2
2.3
2
3
4
1

Posttest

Guided-Practice Module[a]

Subskill Number

Pretest
Unit 1: Learning the Functions of Your System

2.1.A
2.1.B
2.1.C
2.2
2.3
2
3

[a] The same amount of instructional time was available to the traditional and guided-practice groups during the semester. After the presentation by instructor, learners will complete the assignment and submit it before the end of that period.

Guided-Practice Module

Subskill Number

4

1
2.2
2.3

Unit 2: A Procedure for Decimal Tab

3

Unit 3: Using Decimal Tab

4

Posttest

Preinstructional Activities

Preinstructional activities and testing were considered and developed next.

Motivation. To gain the learners' attention, the first event in Gagne theory of instruction proposed to support the learning processes of intellectual skills (1985, p. 246), the instructor explains to learners why this is a very important skill, relating the mastery of this skill to successful achievement of word processing skill, an expectation the audience analysis confirms learners have for this course. And, the instructor informs learners that mastering this skill may help them take advantage of the career opportunities open to women in word processing environments.

He or she explains that they will probably operate a system other than the Exxon system; and after a relatively short period of training, they may be called upon to operate the system and learn advanced functions using only the reference manual as a training resource. The designer elected to have the instructor provide the first stimulus since Laird recommends this strategy for motivating adults (1985, p. 128).

During the instruction, the instructor should provide positive reinforcement for behavior that approximates the appropriate performance as incentive motivation rather than wait until the entire task is completed successfully (Gagne, 1985, p. 306).

Objectives. To give the learners an expectancy of the desired performance that enables them to match their performances with an appropriate performance, the instructor (a) states the objective using a simpler vocabulary than used in the displayed objective and again relating the mastery of this skill to the mastery of marketable word processing skill; (b) encourages learners to examine the objective to facilitate learning to establish why this skill is important to the learner; and (c) demonstrates the desired performance.

This clarifying the objective to motivate the learner by establishing the value of the objective to the learner is recommended by both Gagne (1985, p. 246-247) and Laird (1985, p. 126) and is one example of the influence of their concepts on the instructional design.

In addition, demonstrating the skill is recommended as the second event in instruction for intellectual skills and cognitive strategies by Gagne (1985, pp. 247-248).

Entry Behaviors. The instruction will not be implemented until learners master the required prerequisite skills by successfully completing the introductory lesson, Lesson One, and Lesson Two.

Testing

Testing strategies were developed. The pretest and posttest are identical for both modules.

Entry Behaviors. There will be no entry-behavior test.

Pretest. A pretest will be used during formative evaluation and in both modules when the instruction is administered.

Since, time for testing is limited, the pretest determines if learners have mastered the terminal objective and some key subordinate objectives listed on the hierarical analysis (Dick & Carey, 1985, p. 110).

However, the pretest plays an additional role in the instruction. With the interactive demonstration of the objective that serves as its feedback, it serves as an awareness exercise, an experience, to help learners' understanding of the need for the material that follows as recommended by Michalak and Yager in their experiential learning model (1979, pp. 75-77).

Posttest. The posttest evaluates performance by asking the learners to perform the skill they have learned. It is the example of the eighth event of instruction described by Gagne (1985, p. 255) to support the processes of learning both intellectual and cognitive skills by establishing that the skill is reasonably stable and providing practice to consolidate the skill.

For summative testing, the posttest is included as one section of the midterm examination. Since testing time is a very important factor, it will focus on the terminal objective. However, the posttest administered during formative testing will measure the performance on all of the objectives learned (Dick & Carey, 1985, pp. 109-110).

Information Presentation and Student Participation

Overview of Strategies

After development of the preinstructional activities and testing, separate strategies for information presentation and student participation were developed for the traditional and guided-practice modules, based on the instructional techniques recommended by Gagne. These strategies incorporate five more of the instructional

events described by Gagne (1985, pp. 248-255): (a) stimulating recall of prior learning, (b) presenting stimulus, (c) providing learning guidance, (d) eliciting performance, and (e) providing feedback. These objective-by-objective strategies can be found following the section on follow-through activities in this appendix.

During the presentation of information and their participation, learners are asked to recall a number of previously learned rules and concepts (Gagne, pp. 248-249). For example, in both modules, the learner would be asked to recall the concept of "tab" and the rule, procedure, for printing a document.

Stimulus is presented by delineating of significant features relating to the concept or rule (Gagne, pp. 251-252). For example, in both modules, the problem to be solved, indenting, is displayed in the form of a document to be created that includes a section that learners must indent, and the indented section will be called to the learners' attention by a line diagram illustrating the indentation.

To provide learning guidance, verbal statements of the rules followed by several applications are included in the instruction (Gagne, pp. 252-254). This

procedure is followed throughout the strategies; however, the limited time available for instruction to master learning independently limited the number of applications that could be included. For example, the following verbal statements are presented in both modules:

> You must read the page or pages that relate to the function to determine which steps you must use in creating your document.
>
> Compare any illustrations with the document you are trying to create.
>
> Read the description of the function to be sure it fits the document you are trying to create.

Notice that information describing the problem is also included. This information, "to determine which steps you must use in creating your document," informs learners what the strategy accomplishes and is included to facilitate the processes of learning the cognitive strategy (Gagne, pp. 251-252). After this verbal information is presented in both modules, the rules stated are applied; for example:

Page 5/4 shows that there are three forms of indent. If you compare the illustration for center

indent and the document to be indented, you see that both have sections that are set back from both the left and right margins.

Note that the information is also a verbal description of the cognitive strategy the designer wants the learner to apply, followed by an example of its application. This is the technique recommended by Gagne (1985, p. 253) for providing learning guidance for a cognitive skill.

Performance is elicited in the instruction by asking learners to apply what they have learned to a particular instance not previously encountered during the learning (Gagne, p. 254). For example, in both modules the learners are asked to create and print out a document, Lesson 6-3, that requires them to demonstrate the ability to learn the function decimal tab independently. This document is in their textbook, "Information Processing Keyboarding Applications and Exercises" (Arnold Rosen & William H. Hubbard, 1985, p. 69).

The modules do differ in the instructional strategies used to provide feedback and the amount of feedback provided. In both modules after performances,

learners are informed about the appropriateness of their performances (1985, p. 254). For example, learners are asked what are the three forms of indenting described and given feedback: left indent, right indent, and center indent. In the guided-practice module, however, learners receive additional constructive feedback on their performance on both the activities designed to develop Subskills 2.3, 2, and 3 that is not provided in the traditional module. For example, as feedback for Subskill 2, the learner receives the following feedback:

> If learner lists the steps for decimal tab, a positive comment is supplied. If the learner does not identify the appropriate steps, the similarities or dissimilarities between the description and illustrations in the manual and the description and illustration of the function to be used are pointed out to the learner.

These activities are problem-centered rather than content-centered, actively involve the learner, and develop a collaborative learning environment; therefore, these feedback activities are examples of how the designer incorporated features that recognize the maturity of the adult learner, features outlined by Laird (1985, pp. 124-

125), into the instructional strategy.

Follow-Through Activities

The follow-through activities are designed to enhance retention and transfer, Gagne's ninth instructional event (1985, p. 255).

After the completion of the instruction the instructor stresses the importance of attempting to use the manual to learn functions independently when lecturing and when tutoring the learners individually and requires learners to locate the appropriate section of the manual in both classes.

However, in the guided-practice-module class, the instructor will state and/or demonstrate the procedure to locate the appropriate section of the reference manual when tutoring the learner. This technique provides learners with increased amounts of practice, a technique identified as effective for enhancing retention and transfer of intellectual skills by Gagne (1985, p. 255). In the traditional-module class, the instructor will state where the function can be found in the reference manual and will state the procedure and/or demonstrate the procedure to locate the appropriate section of the manual

only if asked for guidance by the learner when he or she is being tutored. The latter procedure has been followed traditionally to conserve instructional time for producing documents on the word processing system.

A procedure for learning the functions of their systems will be given to learners in both classes as an instructional aid.

Instructional Activities: Traditional Module

Unit 1: Learning the Functions of Your System

SUBSKILL 2.1.A: (VI) State name used to describe the function in the written directions.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to state the name on the sheet provided.

SUBSKILL 2.1.B: (VI) State name used to describe the function during oral instructions.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to state the name of the function on the sheet provided.

SUBSKILL 2.1.C: (VI) State what this function might be named if it were executed on a typewriter.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to state the name of the function on the sheet provided.

Information Presentation:

INFORMATION: Start by listening to the oral instructions and reading the written instructions carefully.

Decide what you are trying to do: (a) by listening to the verbal instructions for the words or word that labels the function, (2) by reading the written instructions for the word or words that label the

function, or (3) by thinking of the words that you would use to tell someone to do this on the typewriter.

EXAMPLES: This function is called "indent" in the written instructions.

Learner Participation:

PRACTICE ITEMS: (2.1) How would you decide what function to use?

FEEDBACK: If appropriate, positive reinforcement such as "good," followed by an open question such as what else could you do? Instructor encourages learners to create the procedure themselves before information is given if possible, prompting if necessary.

Display the following along with any appropriate suggestions made by learners: (a)Listen for name, (b) read the instructions for name, (c) think of typewriter. Instructor should encourage learners to create procedure before giving them information, prompting if necessary.

SUBSKILL 2.2: (IS) Locate the appropriate page number or numbers in the index or table of contents.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of a function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to write down on the sheet provided the page number or numbers that relate to the function.

Information Presentation:

INFORMATION: In order to locate the instructions to perform the function, you must look up the name of the function in the index or table of content of the reference manual and find the page or page numbers that are listed for the function.

EXAMPLES: Here is the table of contents.

Here is the index.

The pages listed for "indent" in the index are 5/4, 5/5, and 5/6.

Learner Participation:

PRACTICE ITEMS: (2.2A) Where would you find the page or page numbers that relate to the function?

(2.2B) Find the table of contents in your manual.

(2.2C) Find the index in your manual.

FEEDBACK: Add the following to the procedure already displayed and any appropriate suggestions made by learners: Look up name in table of contents or index.

Provide learner with positive feedback when he or she locates the index and table of contents or help him or her locate the index and table of contents.

SUBSKILL 2.3: (IS) Discriminate between similarities or dissimilarities on illustration/ illustrations and verbal descriptions on page or pages of the reference manual and the copy for document to be created.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of a function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to write down on the sheet provided the exact name used in the reference manual for the function.

Information Presentation:

INFORMATION: You must read the page or pages that relate to the function to determine which of the instructions you must use in creating your document.

Compare any illustrations with the document you are trying to create. It should look like the document.

In the document we are going to produce, the text is offset five spaces from each margin.

Read the description of the function to be sure it fits the document you are trying to create.

EXAMPLES: Page 5/4 shows that there are three forms of the indent function you can use.

Learner Participation:

PRACTICE: (2.3A) What are the three forms of indenting described?

(2.3B) Which illustration is exactly like the document you are trying to create?

(2.3C) Tell me why the illustrations for left and right indent are not like the document you are trying to create.

(2.3D) What should you do to figure out which group of instructions, steps, you need to use to create your document?

FEEDBACK: State that the three forms of indenting described are left indent, right indent, and center indent.

A line diagram is presented, showing that left indent indents only on the left side; and right indent, only on the right side; but center indent, on both sides. (If a learner should propose combining the left and right functions to achieve the center indent, he or she should be praised for creativity since the document can be created in this manner, although it is not the most efficient way to create the document.)

The illustration for center indent is exactly like the document you are trying to create.

Display the following along with any appropriate suggestions learners make: Compare any illustrations; read the description, does it fit? Instructor should encourage learners to create the procedure before giving the information, prompting if necessary.

SUBSKILL 2: (IS) Locate the instructions to perform the function in the reference manual.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of a function the learner has not performed before to be used, and copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to list the steps given in the reference manual to perform this function.

Information Presentation:

INFORMATION: You will use the instructions under the exact name the reference manual uses for the function to plan a procedure to use in producing the document. Read all the instructions carefully.

EXAMPLE: You will use the steps listed under center indent in your procedure to indent the text in this document.

PRACTICE: (2) List the steps given in the manual for center indent.

FEEDBACK: State the following (Exxon 500 Operator's Reference Manual, 1983, p. 5/5):

1. On the line above where you want the text to be indented, press Code + F5 (Margin and indent).

2. Move the cursor from the left margin to the position where you want the center indent to begin.

3. Press F10 (Center Indent).

4. Type the text to be indented.

5. After the last text to be indented, press Code + F5, then press F9 (End Indent) to end the indent instruction.

SUBSKILL 3: (IS) Generates a procedure to perform the function, while creating the document.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet that gives the page number and the name of the exact name of the function to used, the learner will be able to write down a procedure that will create the document, using the function, if executed on the Exxon Information Processor on the sheet provided.

Information Presentation:

INFORMATION: After reading the instructions for the function, write down--step by step--exactly what you must do to use the function, using as few words as possible. Be sure to include the keys you must press.

EXAMPLES: There are five steps you must execute to center indent text.

Learner Participation:

PRACTICE: (3) What steps would you have to use to center indent text in a document?

FEEDBACK: If appropriate steps are suggested by learners that are not absolutely necessary, display them under the heading "remember" but do not add them to the procedure for center indent. For center indent you might write down the following: (1) Line above-Code + F5, (2) Cursor to position, (3) F10, (4) type text, (5) Code + F5, F9. Display the steps, one below the other, including their numbers.

SUBSKILL 4: (IS) Produce document, using the function at the appropriate point in the creation of the document.

SUBORDINATE OBJECTIVE: (IS) Given the Exxon Information Processor with disk, an Exxon daisy wheel printer with interface, the reference manual, a description of a function learner has not performed before to be used, copy for a 25- to 50-word document that requires the use of the function to produce it, and paper, the learner will be able to make some attempt, even if not completely appropriate, at the appropriate point in the document to execute the procedure.

Information Presentation:

INFORMATION: Now that you have your procedure, you must determine when you should use the the procedure.

Example: The reference manual tells you that you should begin on the line above where you want center indent text.

Learner Participation:

PRACTICE: (4A) After you write down the steps, is there anything else you should determine?

(4B) Would you execute this procedure before you type in your document, within the document, or after typing the document?

(4C) Learners create the pretest document using center indent, taking part in an interactive demonstration led by the instructor who refers to the procedure displayed as the documents are created.

FEEDBACK: Add the following to the procedure displayed along with any appropriate suggestions made by the learners: Decide when to use--before, within, after.

You would execute your procedure within the document. Circle "On the line above" on the procedure displayed for center indent.

Learners successfully complete the pretest document.

Instructional Activities Guided-Practice Module

Unit 1: Learning the Functions of Your System

SUBSKILL 2.1.A: (VI) State name used to describe the function in the written directions.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to state the name on the sheet provided.

SUBSKILL 2.1.B: (VI) State name used to describe the function during oral instructions.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to state the name of the function on the sheet provided.

SUBSKILL 2.1.C: (VI) State what this function might be named if it were executed on a typewriter.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to state the name of the function on the sheet provided.

Information Presentation:

INFORMATION: Start by listening to the oral instructions and reading the written instructions carefully.

Decided what you are trying to do: (a) by listening to the verbal instructions for the words or word that labels the function, (2) by reading the written instructions for the word or words that label the

function, or (3) by thinking of the words that you would use to tell someone to do this on the typewriter.

EXAMPLES: This function is called "indent" in the written instructions.

Learner Participation:

PRACTICE ITEMS: (2.1) How would you decide what function to use?

FEEDBACK: If appropriate, positive reinforcement such as "good," followed by an open question such as what else could you do? Instructor encourages learners to create the procedure themselves before information is given if possible, prompting if necessary.

Display the following along with any appropriate suggestions made by learners: (a) listen for name; (b) read the instructions for name; (c) think of typewriter. Instructor should encourage learners to create procedure before giving them information, prompting if necessary.

SUBSKILL 2.2: (IS) Locate the appropriate page number or numbers in the index or table of contents.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of a function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to write down on the sheet provided the page number or numbers that relate to the function.

Information Presentation:

INFORMATION: In order to locate the instructions to perform the function, you must look up the name of the function in the index or table of content of the reference manual and find the page or page numbers that are listed for the function.

EXAMPLES: Here is the table of contents.

Here is the index.

The pages listed for "indent" in the index are 5/4, 5/5, and 5/6.

Learner Participation:

PRACTICE ITEMS: (2.2A) Where would you find the page or page numbers that relate to the function?

(2.2B) Find the table of contents in your manual.

(2.2C) Find the index in your manual.

FEEDBACK: Add the following to the procedure already displayed and any appropriate suggestions made by learners: Look up name in table of contents or index.

Provide learner with positive feedback when he or she locates the index and table of contents or help him or her locate the index and table of contents.

SUBSKILL 2.3: (IS) Discriminate between similarities or dissimilarities on illustration/ illustrations and verbal descriptions on page or pages of the reference manual and the copy for document to be created.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of a function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to write down on the sheet provided the exact name used in the reference manual for the function.

Information Presentation:

INFORMATION: You must read the page or pages that relate to the function to determine which of the instructions you must use in creating your document.

Compare any illustrations with the document you are trying to create. It should look like the document.

In the document we are going to produce the text is offset five spaces from each margin.

Read the description of the function to be sure it fits the document you are trying to create.

EXAMPLES: Page 5/4 shows that there are three forms of the indent function you can use.

Learner Participation:

PRACTICE: (2.3A) What are the three forms of indenting described?

(2.3B) Which illustration is exactly like the document you are trying to create?

(2.3C) Tell me why the illustrations for left and right indent are not like the document you are trying to create.

(2.3D) What should you do to figure out which group of instructions, steps, you need to use to create your document?

FEEDBACK: State that the three forms of indenting described are left indent, right indent, and center indent.

A line diagram is presented, showing that left indent indents only on the left side; and right indent, only on the right side; but center indent, on both sides. (If a learner should propose combining the left and right functions to achieve the center indent, he or she should be praised for creativity since the document can be created in this manner, although it is not the most efficient way to create the document.)

The illustration for center indent is exactly like the document you are trying to create.

Display the following along with any appropriate suggestions learners make: Compare any illustrations; read the description, does it fit? Instructor should encourage learners to create the procedure before giving the information, prompting if necessary.

SUBSKILL 2: (IS) Locate the instructions to perform the function in the reference manual.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of a function the learner has not performed before to be used, and copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to list the steps given in the reference manual to perform this function.

Information Presentation:

INFORMATION: You will use the instructions under the exact name the reference manual uses for the function to plan a procedure to use in producing the document. Read all the instructions carefully.

EXAMPLE: You will use the steps listed under center indent in your procedure to indent the text in this document.

PRACTICE: (2) List the steps given in the manual for center indent.

FEEDBACK: State the following (Exxon 500 Operator's Reference Manual, 1983, p. 5/5):

1. On the line above where you want the text to be indented, press Code + F5 (Margin and indent).

2. Move the cursor from the left margin to the position where you want to the center indent to begin.

3. Press F10 (Center Indent).

4. Type the text to be indented.

5. After the last text to be indented, press Code + F5, then press F9 (End Indent) to end the indent instruction.

SUBSKILL 3: (IS) Generates a procedure to perform the function, while creating the document.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet that gives the page number and the name of the exact name of the function to used, the learner will be able to write down a procedure that will create the document, using the function, if executed on the Exxon Information Processor on the sheet provided.

Information Presentation:

INFORMATION: After reading the instructions for the function, write down--step by step--exactly what you must do to use the function, using as few words as possible. Be sure to include the keys you must press.

EXAMPLES: There are five steps you must execute to center indent text.

Learner Participation:

PRACTICE: (3) What steps would you use have to use to center indent text in a document?

FEEDBACK: If appropriate steps are suggested by learners that are not absolutely necessary, display them under the heading "remember" but do not add them to the procedure for center indent. For center indent you might write down the following: (1) Line above-Code + F5, (2) Cursor to position, (3) F10, (4) type text, (5) Code + F5, F9. Display the steps, one below the other, including their numbers.

SUBSKILL 4: (IS) Produce document, using the function at the appropriate point in the creation of the document.

SUBORDINATE OBJECTIVE: (IS) Given the Exxon Information Processor with disk, an Exxon daisy wheel printer with interface, the reference manual, the name of a function that the learner has not performed before to use, a procedure for the function that will create the document if it is executed on the Exxon Information Processor, copy for a 25- to 50-word document that requires the use of the function to produce it, and paper, the learner will be able to make some attempt, even if not completely appropriate, at the appropriate point in the document to execute the procedure.

Information Presentation:

INFORMATION: Now that you have your procedure, you must determine when you should use the the procedure.

Example: The reference manual tells you that you should begin on the line above where you want center indent text.

Learner Participation:

PRACTICE: (4A) After you write down the steps, is there anything else you should determine?

(4B) Would you execute this procedure before you type in your document, within the document, or after typing the document?

(4C) Learners create the pretest document using center indent, taking part in an interactive demonstration led by the instructor who refers to the procedure displayed as the documents are created.

FEEDBACK: Add the following to the procedure displayed along with any appropriate suggestions made by the learners: Decide when to use--before, within, after.

You would execute your procedure within the document. Circle "On the line above" on the procedure displayed for center indent.

Learners successfully complete the pretest document.

SUBSKILL 2.2: (IS) Locate the appropriate page number or numbers in the index or table of contents.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of a function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to write down on the sheet provided the page number or numbers that relate to the function.

SUBSKILL 2.3: (IS) Discriminate between similarities or dissimilarities on illustration/ illustrations and verbal descriptions on page or pages of the reference manual and the copy for document to be created.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of a function, and an instruction sheet with copy for a 25- to 50-word document that requires the use of the function to produce it, the learner will be able to write down on the sheet provided the exact name used in the reference manual for the function.

Information Presentation:

INFORMATION: Practice will help you learn how to learn functions independently. Now that we have worked our way through the complete procedure to learn functions independently, you will practice part of the procedure by locating the instructions for another function.

Display a simple diagram of a column of figure aligned by decimal point.

Describe decimal tab, including information that the system will automatically align the decimal points as text is typed and being sure to use the words "tabulation," "tab," and "decimal" in the description.

EXAMPLE: You have just labeled a function "indent"; found that pages 5/4, 5/5, and 5/6 in the reference manual relate to indent; discovered that there are three forms of indent--left indent, center indent, and right indent; and decided to use the instructions for center indent to create a document.

Learner Participation

PRACTICE: (2.2, 2.3) State the exact name that the reference manual uses for the function illustrated and the page or page numbers on which the instructions to perform the function can be found.

FEEDBACK: If the learner labels the function "decimal tab" and locates the exact pages in the reference manual, comment positively; if learner does not locate the appropriate pages, have learner locate the manual table of contents and ask the learner what page is listed for decimal tab, praising the learner for the correct answer, page 5/9.

Unit 2. A Procedure for Decimal Tab

SUBSKILL 3: (IS) Generates a procedure to perform the function, while creating the document.

SUBORDINATE OBJECTIVE: Given the reference manual, a description of the function, and an instruction sheet that gives the page number and the name of the exact name of the function to used, the learner will be able to write down a procedure that will create the document, using the function, if executed on the Exxon Information Processor on the sheet provided.

Information Presentation:

INFORMATION: Be sure you write down everything you must do to use a decimal tab in the exact order that you must do it.

Be sure your procedure includes all the keys you must press.

Reading Step 4 of the procedure for learning functions independently will help you figure out how to go about planning your procedure.

EXAMPLE: Display the procedure generated in Unit 1 to use center indent: (1) Line above--Code + 5, (2) Cursor to position, (3) F10, (4) Type text, (5) Code + F5, F9.

Display the steps, one below the other, including their numbers.

Learner Participation

PRACTICE: (3) In your own words, write down the steps you must execute to use a decimal tab, using as few words as possible.

FEEDBACK: If the procedure the learner generates to use decimal tab will work, positive reinforcement is supplied in the form of a comment from the instructor. If the procedure will not work, the trouble spot is identified, and the learner is directed to the exact point in the reference manual where the information the learner needs to revise the procedure can be found. The revised procedure is reevaluated and a positive comment if given if it will work.

If it is still incorrect after the second try, the instructor should amend the procedure so that it will work.

Unit 3. Using a Decimal Tab

SUBSKILL 4: (IS) Produce document, using the function at the appropriate point in the creation of the document.

SUBORDINATE OBJECTIVE: (IS) Given the Exxon Information Processor with disk, an Exxon daisy wheel

printer with interface, the reference manual, the name of a function that the learner has not performed before to use, a procedure for the function that will create the document if it is executed on the Exxon Information Processor, copy for a 25- to 50-word document that requires the use of the function to produce it, and paper, the learner will be able to make some attempt, even if not completely appropriate, at the appropriate point in the document to execute the procedure.

Information Presentation:

INFORMATION: Read the procedure you have created, looking to determine when you can use the function--before you type the text, at some point within the document, or after typing the text.

Then perform each step, referring to the manual as you work through the procedure if you experience any difficulty.

EXAMPLES: To underline, you must enter the code right before and after the text you want to underline.

Display the following: Enter code _before_ and after to underline.

Learner Participation:

PRACTICE: (4) Use the procedure you have created to help you create and print out Lesson 6-3, using a decimal tab to align the decimal points.

FEEDBACK: Learner successfully completes Lesson 6-3.

Return the document, Lesson 6-3, to the learner with a positive comment if the function is used appropriately. Show learner how to execute the procedure correctly if he or she is unable to execute the procedure successfully by prompting the learner until he or she masters the function.

Appendix G: Summary of Results of Formative Testing[a]

Objectives		2.1	2.2	2.3	2	3	4	1
Traditional Module								
Learner								
1:	Pretest	X	X	-	-	-	-	-
	Posttest	X	X	X	X	X	X	X
2:	Pretest	X	-	-	-	-	-	-
	Posttest	X	X	X	X	X	-	-
Guided-Practice Module								
1:	Pretest	X	-	-	-	-	-	-
	Posttest	X	X	X	X	X	X	X

[a] X indicates objective achieved; - indicates objective not achieved.

Appendix H: Instructional Materials: Traditional and Guided-Practice Modules

The instructional materials for both modules are included in this appendix in their original form in the following order:

1. Pretest: "Learning the Functions of Your System," used in both the traditional and guided-practice modules as a pretest and as an activity sheet in Unit 1.

2. Instructional Aid: "Procedure for Learning the Functions of your System," used in both the traditional and guided-practice modules.

3. Activity Sheet: "A Procedure for Decimal Tab," used in Unit Two of the guided-practice module.

4. Activity Sheet: "Using a Decimal Tab," used in Unit 3 of the guided-practice module.

5. Posttest: "Word Processing Evaluation," used in both the traditional and guided-practice modules. This document is one page of the mid-term examination.

LEARNING THE FUNCTIONS OF YOUR SYSTEM

Instructions: Answer the two questions in Section 1 in the space provided below each question (if you need more space, use the back of this sheet).

Using the automatic formatting function of your system to indent text, create, and print out the document shown in Section 2.

Section 1

1. On what pages in your reference manual are the instructions for indenting text using the automatic formatting function of your system located?

2. What do you have to do to indent text using the automatic function of your system (read the instructions and list the steps you have to execute to use this function, such as which keys you have to press and the order in which you have to press them)?

Section 2

The electronic typewriter is still evolving. ADMINISTRATIVE MANAGEMENT states:

> Today's ETs are feature rich-machines, most of which share a healthy menu of electronic appetizers and automatic entrees'.

These typewriters are functional both as a typewriter and a computer.

PROCEDURE FOR LEARNING THE FUNCTIONS OF YOUR SYSTEM

STEPS

1. DECIDE WHAT THE FUNCTION IS NAMED.

   * Listen to verbal instructions for the word or words that name the function.

   * Read the written instructions for the word or words that name the function.

   * Think of words that you would use to tell someone to do this on a typewriter to label the function.

2. FIND THE PAGE OR PAGES YOU NEED IN THE REFERENCE MANUAL.

   * Look up the name in the index or table or contents (The index is in the large reference manual.)

3. FIND THE INSTRUCTIONS TO USE THE FUNCTION.

   * Compare any illustrations with the document you want to create.

   * Read the description of the function; does it fit the document you are trying to create?

4. USE THE FUNCTION.

   * Read all the steps in the instructions first.

   * Write down the keys you must press.

   * Decide when to use the function--before you type the text, at some point within the text, or after you finish typing in the text.

   * Execute the procedure, referring back to the manual as you work through the procedure.

Name _____

A PROCEDURE FOR DECIMAL TAB

Instructions:

Turn to page 5/9 in the Exxon manual and read the instructions for decimal tabs.

In your own words, using as few words as possible, write down the steps you must execute to use a decimal tab.

When you have written down the steps, bring it up to the instructor.

THIS ASSIGNMENT MUST BE COMPLETED TODAY.

Write your steps here:

Name _____

USING A DECIMAL TAB

Instructions:

Create and print out Lesson 6-3, using a decimal tab to align the decimal points.

Use the procedure that you have written down on the assignment the instructor has just returned to you for help in using the decimal tab.

Call the instructor if you run into any problem creating your document.

THIS DOCUMENT MUST BE HANDED IN TODAY.

Name _____

WORD PROCESSING EVALUATION

INSTRUCTIONS:

1. Create the following announcement, centering it horizontally and vertically on a full sheet of paper and using double spacing.

   Print out a copy of the announcement.

SICHU KIM PAVILION

Authentic Szechuan Cuisine in U.S.A

Open 7 Days for Lunch • Cocktails • Dinner

250 East 54 Street

New York, NY 10028

Reservations: 212 986-4556

INSTRUCTIONS:

2. Create the following document, using single spacing.

   Print out a copy of the document.

If our staff studies the Anderson Report, they will be able to apply this information to improve our productivity.[1] For example, applying this formula to the production of our latest product will decrease our production costs by 15 percent.

INSTRUCTIONS:

3. Create the following document, using appropriate format double space the body of the manuscript, being sure to use a

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